

# New Jersey's Vernal Pools

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## What Happened in 2003?

As the vernal pool project moves into its third season, the volunteer effort has only continued to gain steam. Each year, we have more volunteers, more surveyed pools, and ultimately, more certified/protected pools. Visit our 2003 project updates at [www.njfishandwildlife.com/ensp/vrnpoolupdate03.htm](http://www.njfishandwildlife.com/ensp/vrnpoolupdate03.htm) to see a summary of the progress we've made.

The upcoming 2004 Vernal Pool Training seminars may very well be the last offered by the ENSP, but the project itself will continue. It is our goal that the Vernal Pool Project become a user-friendly, autonomous program with all the information and materials a member of the public needs to learn about vernal pools available online, through mail/fax, or over the phone. Rutgers University's Center for Remote Sensing and Spatial Analysis (CRSSA) vernal pool website, [www.dbcrssa.rutgers.edu/ims/vernal](http://www.dbcrssa.rutgers.edu/ims/vernal), will continue to be an invaluable resource, including an option for online data submittal available before the commencement of the 2004 field season. Please, if you have not already done so, and are interested in vernal pools, join us for one of our training seminars. Visit [www.njfishandwildlife.com/ensp/vpoltrn04.htm](http://www.njfishandwildlife.com/ensp/vpoltrn04.htm) for details.

In addition to the educational materials available on the CRSSA website, the ENSP was proud to announce the release of its own vernal pool field guide, *Salamanders, Frogs and Turtles of New Jersey's Vernal Pools*, in 2003. The guide is a 54-page introduction to vernal pools and the species that use them here in New Jersey. With over 140 color photographs and species accounts specific to our home state, it is our hope this resource will help to answer questions ranging from what does a wood frog egg mass look like to whether or not blue-spotted salamanders occur in Southern New Jersey. Registered Vernal Pool Project volunteers are welcome to a free copy of this publication for use in their herpetological surveys.

In 2003, not only did we more than double our number of certified pools to 715, and nearly triple our number of surveyed pools to 3799, but we also had dozens of occurrences of vernal pool species in new locales. With the large amount of precipitation granted over the year, a handful of observations have been made for the explosive and elusive Eastern Spadefoot Toad in Cape May County as well as a second record in Warren County. The fall breeding Marbled Salamander has an additional record in Northeastern New Jersey as well as a strong showing in Belle Plain State Park vernal pools. Pine Barrens Treefrogs, now listed as a state threatened species, have been documented in several newly surveyed vernal pools throughout the outer coastal plain province.

## What Are Vernal Pools?

Vernal pools are confined wetland depressions, either natural or man-made, that hold water for at least two consecutive months out of the year, and are devoid of breeding fish populations. Here in New Jersey rural portions of the Skylands, Piedmont, and Coastal Plain landscapes are home to the majority of our vernal pools. These unique ecosystems provide habitat to many species of amphibians, insects, reptiles, plants, and other wildlife.

Vernal pools come in an array of forms: isolated depressions within upland forests, seasonally flooded meadows, floodplain swamps, abandoned gravel pits or quarries, and even derelict swimming pools. However, no matter what the structure or genesis of the pool is, all vernal pools either dry out completely or draw down to very shallow levels unsuitable for fish. Fish are highly predatory on amphibian eggs and larvae. Over the course of evolution, several species of salamanders and frogs exploited these fish-less water bodies. Today, these species exhibit "hard-wired" instincts and behaviors that are geared exclusively towards fish-free vernal habitats.



Spotted Salamander

Amphibians that are dependent upon vernal pools are known as "obligate vernal pool breeders." In New Jersey there are seven species - two frogs and five salamanders - that fit this category. Another 14 of New Jersey's amphibians also use vernal pools for breeding, but unlike the 'obligate' species, these species can successfully reproduce in habitats that contain fish. These species are known as "facultative vernal pool breeders."

### Obligate and Facultative Vernal Pool Breeding Amphibians:

#### Obligate Vernal Pool Breeding Amphibians:

Eastern tiger salamander (*Ambystoma t. tigrinum*) **Endangered**  
Marbled salamander (*A. opacum*) **Special Concern**  
Spotted salamander (*A. maculatum*)  
Jefferson salamander (*A. jeffersonianum*) **Special Concern**  
Blue-spotted salamander (*A. laterale*) **Endangered**  
Wood frog (*Rana sylvatica*)  
Eastern spadefoot toad (*Scaphiopus holbrookii*)

#### Facultative Vernal Pool Breeding Amphibians:

Green frog (*Rana clamitans melanota*)  
Bullfrog (*Rana catesbiana*)  
Pickerel frog (*Rana palustris*)  
Southern leopard frog (*Rana utricularia*)  
Carpenter frog (*Rana virgatipes*) **Special Concern**  
Northern spring peeper (*Pseudacris crucifer*)  
Northern cricket frog (*Acris crepitans*)  
New Jersey chorus frog (*Pseudacris triseriata kalmii*)



Vernal Pool in S. Jersey

Upland chorus frog (*Pseudacris triseriata ferarium*)  
Northern gray treefrog (*Hyla versicolor*)  
Southern gray treefrog (*Hyla chrysocelis*) **Endangered**  
Pine Barrens treefrog (*Hyla andersonii*) **Threatened**  
Four-toed salamander (*Hemidactylium scutatum*)  
Long-tailed salamander (*Eurycea l. longicauda*) **Threatened**

*In addition to amphibians, there are several reptiles that inhabit vernal pools on a seasonal basis, primarily to eat the eggs and larvae of amphibians:*

Wood turtle (*Glyptemys insculpta*) **Threatened**  
Spotted turtle (*Clemmys guttata*) **Special Concern**  
Mud turtle (*Kinosternon subrubrum*)  
Eastern painted turtle (*Chrysemys p. picta*)  
Common snapping turtle (*Chelydra s. serpentina*)

### **Vernal Pool Protection in New Jersey**

New Jersey has recently adopted legislation to protect vernal pools. Although the NJ Freshwater Wetlands Protection Act has been in place since 1989, it has done little to protect vernal pools because wetlands smaller than 1 acre (many vernal pools in NJ are ~ 0.25 acre) are exempt from the regulatory protection. Thus prior to the rule vernal pools could be filled, drained, or modified with a general permit. The new vernal pool (or 'vernal habitat,' as it is known in regulatory language) regulations protect vernal pools that are known meet the following certification criteria:

- Occurs in a confined basin depression without a permanently flowing outlet.
- Provides documented habitat for obligate or facultative vernal habitat species (these species are identified in N.J.A.C. 7:7A, Appendix 1).
- Maintains ponded water for at least two continuous months between March and September of a normal rainfall year.
- Free of fish populations throughout the year, or dries up at some time during a normal rainfall year.

For further information on New Jersey's vernal pool certification process go to:

[www.state.nj.us/dep/landuse/announce/announce.html](http://www.state.nj.us/dep/landuse/announce/announce.html)

### **The Vernal Pool Survey Project**



**Eastern Tiger Salamander**

Through grants provided by the U.S. Fish and Wildlife and the DEP's Division of Science, Research and Technology, the ENSP initiated the Vernal Pool Survey Project November 2000. The main objectives of this project are to map and inventory vernal pools statewide and determine the status, range and distribution of obligate (dependent upon) vernal pool amphibians. Because staff resources are limited, the ENSP is relying primarily on trained volunteers to conduct herptile surveys at vernal pools. As data is collected on vernal pools the information is integrated into the land use regulatory databases of the Department of Environmental Protection to implement vernal pool protection.



## How Does the DEP Implement Vernal Pool Protection?

The primary way in which DEP's [Land Use Regulation Program](#) (LURP) is implementing vernal pool protection is through cross-referencing land use permit applications with mapping of certified vernal pools. When a permit is applied for, LURP staff will review maps showing all locations of certified vernal pools.

Projects proposed in vernal pools may need to be redesigned to avoid adversely impacting them, or the permit may potentially be denied. However, this protection can only be applied to vernal pools that have been certified. Thus vernal pool protection in New Jersey is highly dependent upon the generation of a comprehensive map of all the certified vernal pools in the state.

The other method in which DEP intends to protect vernal pools is through Landscape Mapping. This statewide digital mapping, available online since fall 2001, contains critical habitat for all of the New Jersey's endangered, threatened, and special concern animals. The intended purpose of this mapping is to guide sensible land use planning at the state, county and municipal level. Once mapped and inventoried, vernal pools will be incorporated as a data layer into these critical habitat maps.



## Identifying Vernal Pools - [www.dbcrssa.rutgers.edu/ims/vernal](http://www.dbcrssa.rutgers.edu/ims/vernal)

The critical process of locating potential vernal pools for survey begins at the Center for Remote Sensing and Spatial Analysis (CRSSA) lab at Cook College, Rutgers University. Using a collection of computer-aided analysis techniques and field surveys, GIS analysts have been delineating potential vernal pool locations in New Jersey. The Center has compiled a number of GIS (Geographic Information Systems) abiotic data layers (including soils, wetlands, glacial



sediment, and bedrock geology information) to be used in conjunction with digital elevation models and color orthophotography to identify on-screen regions where vernal pools are likely to occur.

Vernal pool likelihood is based on existing vernal pool locations. Various GIS methods have been used to identify and rank areas in each data layer based on vernal pool occurrence. This procedure, which seems to identify areas where large vernal pools are likely to occur, is followed by intensive on-screen scanning of 1-meter digital orthophotography used to locate smaller potential vernal pool locations.

While this research is performed, an interactive Internet mapping site has been developed to enable volunteers and the public to locate potential vernal pools and, in general, introduce those

interested to the project. The site features digital orthophotography as well as other mapping resources aimed at assisting users unfamiliar with aerial imagery. Find this exciting vernal pool information at [www.dbcrrsa.rutgers.edu/ims/vernal](http://www.dbcrrsa.rutgers.edu/ims/vernal).

**Photo Credits:**

Eastern Tiger Salamander by Blaine Rothauser

Others by NJ DF&W, [Endangered and Nongame Species Program](#)

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